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FUNDAMENTAL INTERRELATIONSHIPS
BETWEEN CERTAIN SOLUBLE
SALTS AND SOIL COLLOIDS

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INTRODUCTION

While engaged in an extensive investigation of the physiological effects of NaCl , Na_2SO_4 and Na_2CO_3 on crop plants as grown in the Davis clay loam, in cylinders, under field conditions, the writer observed that the soil to which the salts had been previously applied became so impervious during the course of the experiment as to retard markedly the rate of percolation. So pronounced was this effect that during the winter and early spring months all of the salt-treated soils were continuously covered with standing water. The appearance of this striking modification in the permeability of the soil to water in the salt-treated soils, together with the inferior cultivating qualities exhibited by them, impressed us as evidence of the fact that the salt treatments under the field conditions of the experiment had effected a fundamental change in the physical constitution of the soil. The occurrence and nature of this change and its relation to soil colloids, interior surface, and other properties of soils, form the considerations with which this paper is chiefly concerned.

Just such an effect on the physical condition of the soil as described above had been anticipated as the normal result of adding Na_2CO_3 to the soil, for this salt has generally been conceded, by soil experts, to be an active deflocculating agent. But